

# LIFO Inventories and National Income Accounting

ONE of the significant developments in business accounting in recent years has been the spread of the last-in first-out (Lifo) inventory method. Lifo is a method of inventory accounting whereby the most recent purchases are first charged to cost of goods sold. Lifo thus reverses the usual first-in first-out (Fifo) procedure whereby purchases are charged to cost of goods sold in the historical order in which they are made. During periods of rising prices, computed costs will be higher and reported profits lower under Lifo than under Fifo. Conversely, when prices are falling, costs will be lower and profits greater under Lifo than under Fifo. Over the course of a complete price cycle Lifo profits tend to be more stable than Fifo profits.

The main purpose of this article is to make available newly gathered information on the extent to which Lifo accounting has been adopted by companies engaged in manufacturing and to explain the relationship of the Lifo method to national income accounting. The new information is drawn primarily from a questionnaire survey of Lifo use among manufacturing companies taken in conjunction with the regular Monthly Industry Survey of the Office of Business Economics.

## Use of Lifo in Manufacturing

There are a number of large firms, particularly in the primary nonferrous metals, leather, and petroleum refining industries, which adopted Lifo before the general recognition of the method for income tax purposes in 1939. These were industries, marked by large stocks of basic raw materials with very sensitive prices, which were most seriously affected by the impact of changing inventory costs on income computed by the Fifo method. Firms engaged in leather tanning and in the smelting and refining of nonferrous metals were among the most vigorous advocates of the recognition of Lifo for income tax purposes. When Lifo was first authorized as an acceptable method in the Revenue Act of 1938, its application was limited to specified raw materials of these industries.

In 1939 the authorization of Lifo was extended by legislation to cover any taxpayer, and regulations governing its use were issued by the Bureau of Internal Revenue. The earliest users of Lifo generally applied the method to stocks of homogeneous raw materials. In practice, companies adopting Lifo usually apply the method only to selected items rather than to the entire inventory.

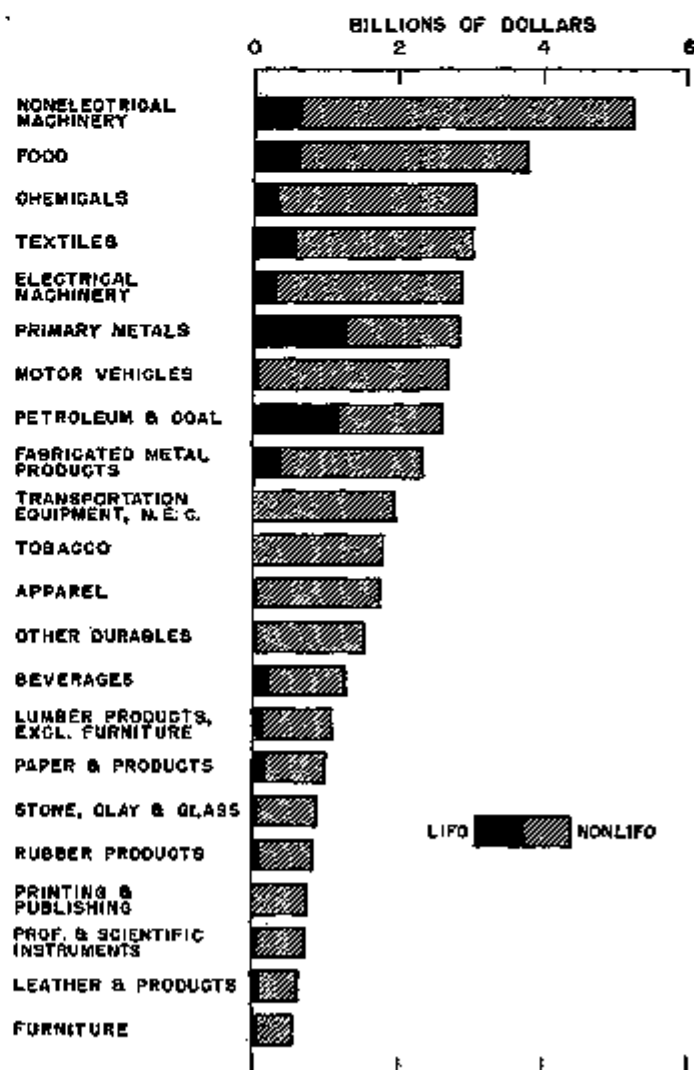
## Growth of Lifo

The approval of Lifo for tax purposes does not appear to have led to a large number of adoptions in 1939 or 1940. The prospect of inflation combined with high wartime tax rates made 1941 the most important single year in the growth of Lifo as measured by the number and industrial diversity of new users. For the first time Lifo accounting was widely used by producers of iron and steel, fabricated metal products, textiles, paper, and lumber, and by meat packers.

The number of firms using Lifo grew steadily during the war and early postwar years, but there is no evidence of a remarkably heavy influx in any single year. Notable increases in the use of Lifo occurred in the chemicals and furniture industries in 1942 and in the electrical machinery industry in 1948.

In 1950 and 1951 the resurgent inflation brought on by the Korean conflict encouraged many firms to initiate Lifo accounting. The nonelectrical machinery industry and the rubber products industry showed significant use of Lifo for the first time in 1950, and additional firms adopted Lifo in industries already marked by some use of the method. This trend continued in 1951 with important increases in the fabricated metal products and nonelectrical machinery groups. As shown in table 1 and the accompanying chart, Lifo accounting was reported in use in 19 of the 22 individual manufacturing industries covered in the 1951 sample survey,

**Estimated Book Value of Lifo  
and Nonlifo Inventories in  
Manufacturing, Year-end 1951**



and approximately 15 percent of the total book value of manufacturing inventories was on a Lifo basis. The table also illustrates the growth of Lifo since 1947 and identifies the industries in which the most recent increases have occurred.

In the interpretation of the industry Lifo ratios shown in table 1, it is important to note that these ratios express the relation between the book value of Lifo inventories and the total book value. Under conditions of rising prices, such as have prevailed since Lifo was introduced, they understate the relative importance of Lifo inventories in terms of physical volume. This is so because the book value placed on Lifo inventories depends on the level of inventory costs prevailing in the original year of Lifo adoption and in other years when physical increments were added to the stock of goods on a Lifo basis.

In contrast, Fifo inventories, which constitute the bulk of non-Lifo holdings, are valued at the most recent costs incurred, or at current market prices if lower than cost, and thus reflect approximately current prices. An accurate measure of the relative importance of Lifo inventories in real terms could be achieved only by the revaluation of book Lifo inventories in the prices at which non-Lifo inventories are valued. Such a revaluation would require more detailed knowledge than is now available of the physical growth of Lifo stocks and of the types of inventories carried on Lifo in the various industries.

### Concentration in large corporations

Lifo accounting is generally concentrated among large-sized corporations. In the primary metals, textiles, and petroleum industries it has also spread to medium-sized corporations, but the method is rarely used by small companies. Although very little information is available on the accounting practices of noncorporate manufacturing firms, it is likely that Lifo is of negligible importance in this sector. The limited use of Lifo among smaller companies may be due to several reasons, such as the relative novelty of the method and the initial cost of introducing it.

### Application to selected inventories

Only in very few cases does a company using Lifo apply the method to its total stock of goods. The most general practice of Lifo users is to employ the method in the valuation of selected raw materials. This is in line with the original interpretation of the Lifo method as applicable to basic, homogeneous goods. In the petroleum industry, for instance, "crude and refined oils" are usually valued on the Lifo basis; in the primary nonferrous industry "metals" are frequently on Lifo; and in the textile industry the Lifo method is often confined to "cotton and cotton content." In recent years, however, there has been an increasing tendency to extend the Lifo principle to other types of inventory goods.

The regulations of the Bureau of Internal Revenue relating to the mechanics of applying Lifo have been given a gradually more flexible interpretation during the years of experience with the method. Following the original conception of Lifo, the Bureau at first approved its use only in the valuation of categories of strictly identical goods.

In 1944 this policy was altered to permit the combination of similar but not identical raw materials into single groups. Producers of cotton textiles, for example, were allowed to group together all types of raw cotton despite differences in length of staple, color, or grade. Prior to this provision a firm which no longer used a particular type of cotton would be obliged to liquidate stocks of that type at original Lifo

costs, since it could not replace them, for tax purposes, with cotton of any other type. In other words, inventories used up would not be valued at current replacement cost and the advantage of applying the Lifo method would be lost in these instances.

In November 1949 the Bureau extended general approval to the "dollar value" method. The efficacy of Lifo in placing

Table 1.—Estimates<sup>1</sup> of Lifo inventories for manufacturing industries<sup>2</sup>, year-end 1951 and year-end 1947

|                                                        | 1951                          |                 | 1947         |              |
|--------------------------------------------------------|-------------------------------|-----------------|--------------|--------------|
|                                                        | Total book value <sup>3</sup> | Lifo book value | Lifo percent | Lifo percent |
|                                                        | (millions of dollars)         |                 |              |              |
| Total manufacturing.....                               | 43,054                        | 6,375           | 15           | 12           |
| Durable-goods industries.....                          | 22,650                        | 2,999           | 13           | 10           |
| Primary metals.....                                    | 2,825                         | 1,254           | 44           | 41           |
| Fabricated metal products.....                         | 2,330                         | 377             | 16           | 11           |
| Electrical machinery.....                              | 2,373                         | 211             | 9            | 3            |
| Machinery, excluding electrical.....                   | 3,229                         | 616             | 19           | 4            |
| Motor vehicles and equipment.....                      | 2,582                         | 53              | 2            |              |
| Transportation equipment excluding motor vehicles..... | 1,939                         |                 |              |              |
| Lumber products except furniture.....                  | 1,092                         | 133             | 12           | 12           |
| Furniture and fixtures.....                            | 856                           | 84              | 10           | 11           |
| Stone, clay and glass products.....                    | 805                           | 73              | 9            |              |
| Professional and scientific instruments.....           | 738                           | 42              | 6            | 3            |
| Other including ordnance.....                          | 1,511                         | 55              | 4            | 2            |
| Non-durable-goods industries.....                      | 20,406                        | 3,376           | 17           | 14           |
| Food and kindred products.....                         | 8,703                         | 553             | 6            | 12           |
| Beverages.....                                         | 1,252                         | 223             | 18           | 14           |
| Tobacco.....                                           | 1,745                         |                 |              |              |
| Textile mill products.....                             | 3,615                         | 56              | 2            | 17           |
| Apparel and related products.....                      | 1,732                         | 44              | 3            |              |
| Leather and products.....                              | 653                           | 104             | 16           | 26           |
| Paper and allied products.....                         | 987                           | 180             | 18           | 24           |
| Printing and publishing.....                           | 705                           |                 |              |              |
| Chemicals and allied products.....                     | 3,064                         | 359             | 12           | 20           |
| Petroleum and coal products.....                       | 2,800                         | 1,194           | 43           | 46           |
| Rubber products.....                                   | 516                           | 97              | 19           |              |

<sup>1</sup> Over 2,300 corporations of all sizes and in every phase of manufacturing activity were asked to report the book value of their Lifo inventories, if any, at the end of 1951. Firms using Lifo were also asked to indicate the year in which they first adopted the method. Some 1,800 filled-in questionnaires were returned. For the most part, non-respondents were confined to smaller companies. Replies to this survey were supplemented by Lifo data from the published financial statements of large firms not covered by the survey. Lifo estimates for the rubber products industry are based on a special survey taken by the Rubber Manufacturers Association at the request of the Office of Business Economics.

In the preparation of the regular monthly manufacturing sales and inventory estimates based on the Monthly Industry Survey, the sample firms are divided into major industry and minor industry groups and, finally, into total asset size class cells. Corporate and non-corporate figures are handled separately. This classification system was used in processing the Lifo data. Sample data on Lifo book value were compared with total book value figures reported by the same corporations to derive sample Lifo ratios for each cell within corporate manufacturing. These ratios were then applied to the estimated total book value of corporate inventories for the corresponding cells and the results added to derive the industry Lifo book value totals shown in table 1. It was assumed that noncorporate manufacturers did not hold inventories on a Lifo basis. Noncorporate manufacturing inventories account for less than 5 percent of the total and represent the holdings of small companies which very rarely use the Lifo method.

<sup>2</sup> The Lifo ratios shown for year-end 1947 are based on a similar survey taken in 1948.

<sup>3</sup> The above industrial classification is that used in the Commerce Department series of manufacturers' sales and inventories.

<sup>4</sup> Book value, end of year, as reported in SURVEY OF CURRENT BUSINESS, October 1952, p. 12.

Source: Office of Business Economics, U. S. Department of Commerce.

the cost of goods sold on a current replacement cost basis was further increased by this amendment, to the extent that it permitted the replacement of inventories used up by related but not strictly identical items on a wider scale than before.

These gradual changes in the policies regarding Lifo have made the application of the Lifo method practicable and advantageous for an increasing number of taxpayers.

### Primary metals

Over one-fifth of the total estimated book value of manufacturing inventories on Lifo in 1951 was held in the primary metals industry. The overall industry Lifo ratio of 44 percent is a composite of subgroup ratios of 65 percent for iron

and steel, 35 percent for nonferrous metals, and 15 percent for other primary metals.

Several major producers of nonferrous metals used Lifo accounting even before 1939, but it was not until 1941, when a number of prominent iron and steel firms adopted the method, that Lifo became an important factor in the industry as a whole. Further significant adoptions of Lifo occurred in 1947, 1950, and 1951.

Nine of the 11 largest steel companies and 9 of the 13 largest nonferrous metal companies used the Lifo method in 1951, but the proportion of the total book value that is carried on the Lifo basis varies widely for individual companies from less than 5 percent to over 90 percent. The higher Lifo ratio for the iron and steel group stems from the fact that, on the average, Lifo firms in that group carry a higher proportion of their total book value on the Lifo basis than do nonferrous metal producing companies.

### *Petroleum and coal products*

The highest 1951 Lifo ratio for a single industry is found in the petroleum and coal products group. This industry accounts for nearly one-fifth of the total book value of Lifo inventories. Several years before Lifo was approved for tax purposes, the Board of Directors of the American Petroleum Institute recommended to the membership the application of Lifo in the valuation of raw material inventories.

A number of the petroleum firms covered in the present survey reported adoption of Lifo before 1939, and another substantial segment of the industry switched to the Lifo method in 1941. There were sporadic new entrants during the war and early postwar years, but only a few relatively small firms have initiated Lifo accounting since 1947. There are still several very large petroleum refining companies which make no use of the Lifo method, but, on the other hand, Lifo seems to be more widely employed by smaller companies in this industry than in any other.

### *Nonelectrical machinery*

The growth of Lifo accounting in the nonelectrical machinery group is particularly interesting because the method was used only to a very limited extent before 1950. Amendment of the tax regulations concerning Lifo to permit use of the "dollar value" method previously referred to greatly simplified the application of Lifo accounting to the numerous and varied items that make up the inventories of a machinery firm. It is probable that this change of the tax regulations and further increases in material and labor costs were the major reasons for the adoption of Lifo by numerous machinery manufacturers in 1950 and 1951.

There is considerable variation among the machinery subgroups as to the relative importance of Lifo inventories. Over one-half of the estimated total book value of Lifo inventories in machinery are held by manufacturers of agricultural machinery. Lifo has also become an important factor in the office and store machinery and construction machinery industries. On the other hand, there has been only scattered use of Lifo in the metalworking machinery, special industry machinery, and household machinery subgroups.

The Lifo method has been adopted by relatively few firms in the nonelectrical machinery industry in comparison to its broad acceptance in the primary metals, petroleum, and textile industries. But many of the largest companies use the method and apply it to the major part of their total inventories. The latter feature reflects the broader applicability of Lifo permitted by the recent amendment of the Treasury regulations.

### *Foods, textiles, and other products*

In the food industry, nearly 40 percent of the total Lifo book value is found in meatpacking and 30 percent in the canning and preserving industry, with the remainder scattered through the grain, dairy products and other foods subgroups. For the most part, the meatpacking firms on a Lifo basis adopted the method in 1941. In the other subgroups the dates of Lifo adoption are clustered in two periods, 1941-42 and 1950-51.

The growth of Lifo in the textile industry has been very gradual, with new firms adopting the method in nearly every year since 1939. Lifo has gained wide acceptance even among medium-sized corporations. Almost one-half of the sample firms covered in the survey report some use of Lifo, but the proportion of inventories held on Lifo is often quite small.

The specific industries discussed above are the chief Lifo industries from the point of view of aggregate book value of Lifo stocks. There are other industries, however, such as beverages, paper and products, leather, and fabricated metal products, which value a relatively high proportion of their stocks on Lifo. The most notable growth of Lifo since 1947 is found in the machinery, rubber products, and stone, clay and glass industries. In comparing Lifo ratios for 1947 and 1951, it should be noted again that the ratios relate only to book value data. Just as the book value ratios given generally understate the proportion of Lifo stocks to total physical stocks, increases in the book value ratios between 1947 and 1951 understate the relative growth of Lifo inventories in real terms.

### *Nature and Effects of the Lifo Method*

The nature of the Lifo method may be best explained by contrasting it with the traditional first-in first-out (Fifo) method which is by far the most widely used inventory accounting procedure. Under both Lifo and Fifo, inventories are valued at original costs, but because the two methods embody opposing assumptions as to the flow of inventory goods their application yields divergent results in periods of price change.

### *Flow of inventory goods*

Despite the implication of the terms "first-in first-out" and "last-in first-out," neither of these methods necessarily accords with the actual physical flow of goods out of inventory. They represent, rather, alternative assumptions, for cost purposes, as to the order in which inventory goods are used up or sold. The Fifo method assumes that the earliest goods acquired are the first to be used up or sold. The Lifo method employs the reverse assumption as to the flow of goods through the inventory. The goods most recently acquired are assumed to be the first used up or sold.

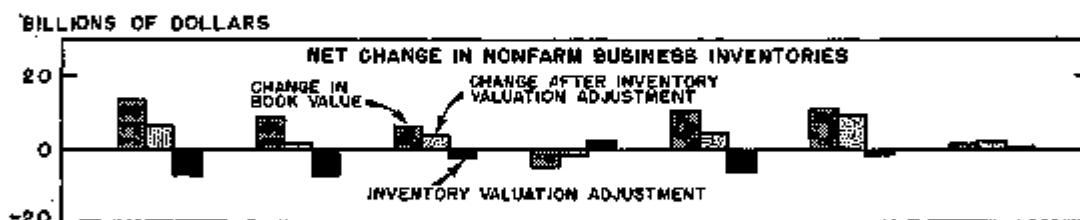
Thus, under Fifo current sales are matched to some extent with prior period costs. Lifo, on the other hand, applies the most recent costs incurred against current sales, thereby matching current costs against current revenue. Past period costs are charged against current revenue only if stocks used up or sold exceed current purchases, in other words, to the extent that there is a decline in physical stocks.

### *Valuation of inventory holdings*

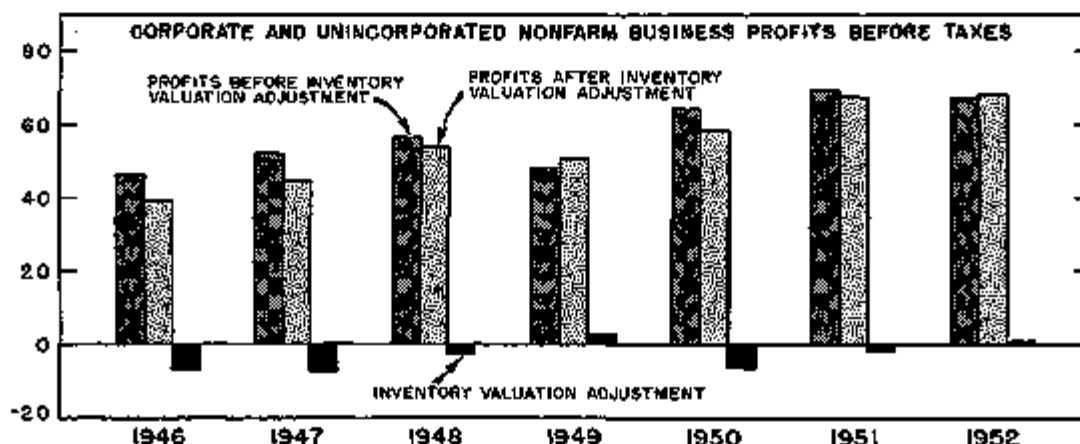
The valuation placed on the inventory remaining on hand under the two methods is implicit in the treatment of costs incurred. Since the Fifo method assumes that goods are

## Effect of Inventory Valuation Adjustment on Book Value Inventory Change and Business Profits

On the product side of the production account, the inventory valuation adjustment converts the book value inventory change to show physical change at current prices



On the cost side of the production account, the inventory valuation adjustment places cost of sales on a current cost basis, and thus shows profits accruing from current production



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used up in the order in which acquired, it follows that the ending inventory of each period is made up of the goods most recently acquired and is valued at the cost of these goods. If the common practice of valuing inventories at the lower of cost or market is followed, ending inventories will be valued at current market prices when these are lower than cost. Fifo thus provides a balance sheet inventory figure closely reflecting current cost.

Under Lifo, on the other hand, the ending inventory is assumed to be made up of the earliest goods acquired and is valued at the original cost of such goods. Only the physical increment in any year is valued at current cost. The balance sheet value of Lifo inventories, therefore, may be more or less remote from a current valuation, depending largely on the degree of price change taking place between the original year of adoption of Lifo and the current period. (Users of the Lifo method for tax purposes are not permitted to write down the value of their inventories below the original Lifo cost, even though current cost or market price should fall below that level.)

If, for example, a firm maintains a constant physical stock of inventories through an extended period of price increases, application of the Fifo method will place a higher value on this constant stock at the end of successive accounting periods, thus reflecting the increased cost of inventory goods. Under Lifo accounting, however, assuming the method to be adopted in the first year of the period, the inventory

will be carried at a constant dollar value reflecting costs of the original year of adoption.

### Determination of profits

Perhaps the most significant difference between the Lifo and Fifo methods relates to their effects on the determination of business income. The cost of goods sold and, therefore, the net income are calculated with reference to the change in the value of inventories during the year. The standard formula is: cost of goods sold equals beginning inventory plus purchases less ending inventory.

As pointed out above, the Fifo method, during periods of rising prices, places a higher value at each year-end on a constant physical volume of inventories, while the Lifo method carries these constant stocks at constant prices. It is apparent that, given these conditions, application of the Fifo method will result in a lower cost of goods sold and a higher reported profit than the Lifo method.

The same point can be demonstrated directly in terms of the flow of costs. In a period of stable prices, the cost of goods sold calculated by the Fifo method, with the earliest costs charged to sales, will be roughly equivalent to the cost of goods sold computed by the Lifo method, with the latest costs charged to sales. With prices rising, however, costs are lower and profits higher under Fifo than under Lifo, since costs charged to sales are the earliest (lowest) costs

under Fifo, but the most recent (highest) costs under Lifo. In a period of declining prices, costs will be lower and profits higher under Lifo than under Fifo.

The following concise characterization of Lifo has been given by the Committee on Accounting Procedures of the American Institute of Accountants: "The Lifo method of accounting for inventory costs, as now applied, is an accounting device for applying incurred costs in a manner, the purpose of which is to relate costs to revenue more nearly on the same price level base than would the Fifo method."

The following example<sup>1</sup> illustrates the principal differences between Lifo and Fifo in determining income:

| Item                                             |                                     | Fifo  | Lifo       |
|--------------------------------------------------|-------------------------------------|-------|------------|
| Sales                                            | 480 units at \$7                    | 3,360 | 3,360      |
| Less: Cost of goods sold                         |                                     | 2,300 | 2,400      |
| Beginning inventory                              | 100 units at \$4                    | 400   | 400        |
| Plus: Purchases                                  | 500 units at \$5                    | 2,500 | 2,500      |
| Less: Ending inventory                           |                                     |       |            |
| Fifo                                             | 120 units at \$5                    | 600   |            |
| Lifo                                             | 100 units at \$4<br>20 units at \$5 |       | 400<br>100 |
| Equals: Gross profit                             |                                     | 1,060 | 960        |
| Less: Administrative, selling and other expenses |                                     | 300   | 300        |
| Equals: Profit                                   |                                     | 760   | 660        |

The difference between Lifo and Fifo as to the order in which the cost of goods is charged against sales is reflected in the cost of goods sold. The Lifo method value inventories used up at the latest costs incurred, represented by current period purchases. Under this method the total cost of goods sold is \$2,400, all 480 units sold being valued in terms of their current cost of \$5 per unit.

Under Fifo the earliest costs incurred, represented by beginning inventory of 100 units at \$4 each, are first charged to costs of goods sold. Only the additional 380 units sold are valued at the current cost of \$5 per unit, so that the total cost of goods sold is \$2,300. In other words, cost of goods sold under Fifo falls short of current replacement cost by the excess of the current replacement cost over the original cost of the inventories used up in production.

Since, in the example, beginning inventory and purchases are identical under both Lifo and Fifo, the difference between the two methods in the calculation of cost of goods sold is reflected in the entry for ending inventory. Under Lifo, ending stocks, up to the quantity on hand at the beginning, are valued at beginning cost of \$4 per unit, and only the physical increment is valued at current cost of \$5 per unit. Thus, the increase in the book value of Lifo inventories is equivalent to the physical change at current prices.

Under Fifo the ending inventory comprises the most recent purchases and is valued at current cost of \$5 per unit. The book value increase in inventories of \$200 shown under Fifo is accordingly in excess of the physical increment of 20 units at current prices shown by Lifo, because it reflects in addition the increase from \$400 to \$500 in the value placed on equivalent inventories of 100 units at the beginning and end of the period. It may be noted that this element of inventory appreciation is equivalent to the excess of the current replacement cost over the original cost of inventories used up in production which, as has been shown, is an element of the Fifo cost of goods sold.

The foregoing example illustrates how, in periods of changing cost prices, the different assumptions relating to the flow of inventory goods made under Lifo and Fifo result in different measures of inventory change, cost of goods sold, and profits. As will be shown later, the method of inventory valuation adopted in national income accounting resembles

closely the Lifo method. The inventory valuation adjustment by which the change in the book value of inventories and the corresponding profit data are adjusted for inclusion in the national income and product accounts is closely similar to the difference between the Fifo and Lifo measures of profit and inventory change.

The principal reasons for the adoption of Lifo are suggested by the foregoing comparison with the Fifo method.

### Cost of replacing inventories

Under Fifo, if prices increase, the full cost of replacing physical inventories is not reflected in cost of goods sold. Part of the reported profit thus represents only the increased cost of carrying inventories and cannot be realized if physical stocks are to be maintained without liquidating other assets or increasing the indebtedness of the business. Employees and stockholders, however, may assume that reported profits are available for distribution as increased wages and dividends or for use in capital investment.

The Lifo method, by pricing inventory goods used up or sold at current replacement cost, provides a measure of income after provision has been made for the increased cost of carrying inventories. Proponents of Lifo accounting contend that Lifo profits are therefore more meaningful and realistic. The desire for a profit figure more in line with disposable cash has been an important motive in the shift from Fifo to Lifo.

Another reason for the spread of Lifo is the greater stability of Lifo profits relative to Fifo profits over an extended period. Lifo profits are lower in times of rising prices when profits are typically high. Conversely, reported profits are greater (or losses smaller) under Lifo than under Fifo in times of falling prices when profits are typically low. To many businessmen the smoother, more stable picture of earnings provided by Lifo is one of the more attractive features of the method.

### Tax considerations

The rapid growth of the Lifo method since 1939 would certainly not have occurred in the absence of a steadily rising price level and relatively high rates of corporate income taxation. Since the Lifo method yields lower profits figures in times of rising prices than the Fifo method, there has been a significant tax advantage in its adoption in the inflationary conditions of recent years. This advantage has been accentuated by the high wartime and postwar tax rates.

An offsetting tax disadvantage arises in years of falling prices when the Lifo method yields higher profits, or smaller losses, than the Fifo method. Over a complete price cycle total profits before taxes will tend to be similar, for any one firm, under either inventory method. If one assumes that tax rates are likely to be higher on the price upswing (when profits under Lifo are lower) than on the downswing (when profits under Lifo are greater), a net tax advantage would probably accrue to the users of Lifo.

### Factors limiting use of Lifo

One of the most common objections to Lifo relates to the carrying of inventories in the balance sheet at original Lifo costs rather than at current price levels. This feature of Lifo tends to give a distorted impression of the current asset position, and it has been widely suggested that firms using Lifo provide an additional entry for the approximate value of inventories at current prices.

It may also be noted that the application of the Lifo method raises new problems of accounting that do not arise in connection with Fifo. For instance, in the preparation of interim quarterly financial statements, purchases charged to

<sup>1</sup> For purposes of exposition it has been assumed, in the example and in the text, that prices change between accounting periods but are constant within periods. This assumption greatly simplifies the discussion and does not affect the substance of the comparison of the Lifo and Fifo methods.



Table 2.—National Income and Product Account, 1951

(Billions of dollars)

| Costs of production                                                          |       | Output of goods and services                          |       |
|------------------------------------------------------------------------------|-------|-------------------------------------------------------|-------|
| Compensation of employees.....                                               | 178.9 | Personal consumption expenditures.....                | 208.0 |
| Income of unincorporated enterprises and inventory valuation adjustment..... | 41.8  | Gross private domestic investment.....                | 58.5  |
| Farm.....                                                                    | 15.6  | New construction and producers durable equipment..... | 42.2  |
| Business and professional (including inventory valuation adjustment).....    | 26.2  | Change in business inventories.....                   | 10.3  |
| Before inventory valuation adjustment.....                                   | 26.4  |                                                       |       |
| Inventory valuation adjustment.....                                          | -1.4  | Farm.....                                             | 0.9   |
| Rental income of persons.....                                                | 8.0   | Nonfarm.....                                          | 8.4   |
| Corporate profits and inventory valuation adjustment.....                    | 41.8  | Change in book value.....                             | 11.1  |
| Corporate profits before tax.....                                            | 42.9  | Inventory valuation adjustment.....                   | -1.7  |
| Inventory valuation adjustment.....                                          | -1.2  |                                                       |       |
| Net interest.....                                                            | 0.4   | Not foreign investment.....                           | 0.2   |
| National income.....                                                         | 277.8 | Government purchases of goods and services.....       | 62.6  |
| Other charges against gross national product.....                            | 51.6  | Gross national product.....                           | 329.2 |
| Charges against gross national product.....                                  | 329.2 |                                                       |       |

Source: Office of Business Economics, U. S. Department of Commerce.

cost of goods sold may differ from those charged on an annual basis. Special adjustments or estimates may be required in preparing the quarterly statements in order to keep them on a basis consistent with that used in annual reports. The use of the "dollar value" method, which in many cases is necessary for securing the full advantages of the Lifo method, also raises new problems for business accounting. Moreover, in many instances, price fluctuations of inventory goods do not have sufficient effect on the income statement to warrant the substitution of Lifo for the more conventional methods of inventory accounting.

Many firms have hesitated to adopt Lifo at the price levels of the postwar years on the ground that prices might soon turn downward, resulting in a higher tax liability under Lifo than under Fifo.

### Relation to National Income Accounting

Gross national product and charges against gross national product are alternative measures of the output of final goods and services produced by the Nation's economy. Gross national product comprises the purchases of goods and services by consumers and government, gross private domestic investment and net foreign investment. Charges against gross national product are the sum of all costs incurred in the production of national output. Included are the factor costs of labor and property, which comprise the national income, as well as other costs—mainly capital consumption allowances and indirect business taxes. These two measures of national output are exhibited in the national income and product account.

### Inventories in national accounts

In the determination of gross national product, changes in the physical volume of inventories held by business must be included as a component of private investment. An increase in inventories constitutes a part of current year's production. A decline in inventories represents a drawing upon the production of earlier years. Increases in inventories must therefore be added to, and decreases deducted from aggregate sales to consumers, government, and for fixed investment purposes to arrive at a measure of output.

Since the aim is to derive a measure of the market value of current production, it is essential that the inventory change included in gross national product should represent physical quantities valued at current prices. Insofar as the book value change reported by business for a given period in-

cludes, in addition, the appreciation or depreciation in the value of inventories that is due to changes in the prices of inventory goods, an inventory valuation adjustment is required to exclude this element.<sup>2</sup>

For example, if prices are rising, the change in the book value of inventories exceeds the value of physical change at current prices, and a negative adjustment must be made to book value change. Conversely, when prices are falling, a positive adjustment to book value change is needed.

To the extent that the change in the book value of inventories is adjusted in order to determine the inventory change component of gross national product, an identical inventory valuation adjustment to reported business profits is required on the cost or income side of the account. This is so because, as has been shown, the book value change in inventories enters as an element in the calculation of profits. The adjusted measure of business profits represents income arising from current production. The cost of goods sold is stated in terms of current replacement cost, and, consequently, profits exclude elements that stem from the price appreciation or depreciation of stocks.

The application of the inventory valuation adjustment to book value change and reported profits is illustrated above in the national income and product account for 1951. The account has been abridged and somewhat recast in order to show more clearly the effects of this adjustment.

As can be seen, an inventory valuation adjustment of minus \$1.7 billion is applied on the right side of the account to the change in the book value of total nonfarm inventories (corporate and noncorporate) to convert it into a measure of the physical change in current prices. This adjustment is matched by corresponding entries of minus \$0.4 billion and minus \$1.3 billion applied, respectively, to unincorporated and incorporated business income on the left side of the account.

### Lifo and national income accounting

The basic principle of the Lifo method, the charging of current costs to current revenues, is essentially the same as that embodied in the national income concepts. So long as physical stocks of Lifo inventories are stable or increasing, figures for inventory change and business income reported on a Lifo basis require no inventory valuation adjustment for national income and product purposes, since any physical

<sup>2</sup> This adjustment for price change concerns only the nonfarm business sector, since the basic data on farm inventory change are already expressed in terms of physical quantity change at current prices.

increment in Life stocks is valued at current prices, and inventories used up in production are valued at current replacement cost.

If physical stocks decline, however, some adjustment of Life inventories is necessary for consistency with national income concepts since these liquidations, under Life, will be valued at cost prices of an earlier period, not at current prices. On the product or output side an inventory valuation adjustment is needed to convert the reported change in book value to a current price basis. On the income side an equivalent adjustment must be applied to reported income in order to place the cost of inventories used up on a current cost basis. Adjustments required by declines in Life stocks have been negligible in the years since Life was introduced, but could become quite large in the event of heavy inventory liquidations.

### *Fifo and national income accounting*

The use of data based on Fifo accounting raises greater difficulties for national income estimating. If prices are changing rapidly, the difference between current costs and the historical costs charged under Fifo may be quite large. This is reflected in substantial departures of the book value change in inventories and of book profits from the measures required for national income purposes. The estimation of the inventory valuation adjustment by means of which conversion of reported data into national income concepts is accomplished constitutes one of the most difficult steps in national income estimation.<sup>3</sup>

The sharp contrast between the Life and Fifo methods as to the degree of adjustment required to bring their results into line with national income concepts serves to emphasize the need for information on business accounting. The data on the book value of inventories and business income used in national income and product estimates are taken from the compilations of income tax returns provided by the Bureau of Internal Revenue in "Statistics of Income." No indication is given of the extent to which various inventory methods are used in the returns underlying these compilations. The

<sup>3</sup> A detailed description of the procedure used to adjust the book value of inventories for use in the national income and product account is provided in the 1951 *National Income Supplement to the Survey of Current Business*.

present survey and earlier studies of the extent of Life inventory accounting are attempts to fill this gap in the basic data and thereby achieve greater accuracy in the treatment of inventories in the national accounts.

### *Magnitude of inventory valuation adjustment*

The size of the inventory valuation adjustment depends on the amount of non-Life inventories and the rate at which prices are changing. Whether the adjustment to book value change and reported income is positive or negative depends on the direction of the price change taking place. In years of rising prices, the Fifo method yields a measure of book value change which overstates the value of physical change at current prices and a measure of book profits which is correspondingly overstated. Consequently, a negative adjustment is required. During periods of price decline, the inventory valuation adjustment is positive.

Except for the years 1949 and 1952, when moderate price declines occurred, the inventory valuation adjustment has been consistently negative from 1939 through 1952. The adjustment was largest in the years of greatest price increases, 1946, 1947, and 1950. The chart on page 19 illustrates the magnitude of the inventory valuation adjustment in recent years and its impact on book value inventory change and business profits.

Inventory growth has characterized the postwar period, but in most years it has been overstated by the reported change in book value. In 1947, for example, only \$1.4 billion of the book value change of \$8.7 billion represented physical change at current prices. The additional \$7.3 billion increase in book value represented the effect of rising prices on inventory valuation.

The inventory valuation adjustment, in recent years, has correspondingly reduced the series on nonfarm business profits included in the national income accounts below the unadjusted figures based on business accounting practices. For instance, in 1946 and 1947 the inventory valuation adjustment accounted for about 15 percent of estimated book profits before tax. The required adjustment was smaller in other years, reaching its lowest level in 1952 when prices were relatively stable.

## ***Trends in Industrial Output***

*(Continued from page 8)*

slower pace. Output in the first quarter, according to the Federal Reserve seasonally adjusted production index of major consumer durable goods, was up more than two-fifths from the relatively low year ago volume and more than 10 percent from the fourth quarter of 1952.

The improvement in production was general with output of furniture and of radios and television sets virtually matching their earlier highs. Other lines—household appliances and rugs—remained well below former peaks.

### *Passenger car output*

The production of passenger cars, by far the most important of the consumer hard goods lines in terms of value, accounted for the largest relative gain in the total index. Out-

put of passenger cars was stepped up rapidly following settlement of the work stoppage in the steel mills last summer. In the fourth quarter of 1952, the industry rolled out 1.3 million units, a weekly average of 100,000. In January and February, completions averaged nearly 115,000 per week and this was increased to 130,000 in March. The total for the quarter was 1.3 million units. With steel continuing to flow in enlarged quantities and two shift operations in a number of assembly plants, completions in April averaged more than 135,000 cars per week, indicating a total run of 600,000 cars for the month, the first time the industry hit this high mark since March, 1951, when 617,000 cars were produced.

The increasing rate of passenger car production has been

*(Continued on page 24)*